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People-environment trade-offs in managing communal rangelands of South Africa

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Abstract

Communal rangelands in South Africa support a range of ecosystem services including water provision, carbon sequestration and livestock production for different stakeholders. Delivering these in a sustainable and socially appropriate manner necessarily requires trade-offs to be made between the different environmental and social outcomes required. We draw on empirical fieldwork and a two-day participatory stakeholder workshop to report on the early stages of a project evaluating these trade-offs in communal rangelands of the uMzimvubu catchment in Eastern Cape Province. Our findings suggest that trade-offs will be necessary at a variety of different levels within this system. For example, a key activity within these rangelands is removal of invasive plants such as wattle (*Acacia mearnsii*) but the environmental gains are conflictual as although this increases water availability within the system, it potentially reduces stored carbon. Wattle removal also highlights a disconnection between people and policy. While current policy mandates complete eradication of wattle, none of the local communities involved in the research wished to see this, as most of them currently make use of the trees for a range of purposes including timber, fuelwood and even livestock feed. Furthermore, trade-offs are also required between different community members, in terms of the social outcomes rangelands can deliver for them. While men conceptualised rangelands largely in terms of maximising livestock production, women focused on the collection of natural resources such as timber, herbs and thatching grass, the latter requiring accumulation of biomass during the growing season and potentially removing areas of rangeland from grazing. Understanding the opposing goals for rangeland use that exist within and between different stakeholder groups is critical to evaluating the social and environmental trade-offs required and to reach a consensus approach to the governance and management of these systems.

Introduction

Communal rangelands in South Africa provide a range of vital ecosystem services to stakeholders from a number of different sectors. The primary beneficiaries of these services include the public sector, through the broader environmental role that rangelands play, for example, in carbon sequestration and downstream water provision (Palmer and Bennett 2013), and local communities who benefit directly from the provisioning services that rangelands provide in the form of livestock production and provision of fuelwood and timber (Shackleton et al. 2001). However, decisions about which services are important and to whom, differ according to the priorities these different stakeholders ascribe to them. The public sector, for example, uses governmental actors to establish environmental policy that reflects national priorities whilst communities have their own traditional governance systems that reflect local resource management priorities. This creates a potential disconnect between government policy on the one hand, which views communities as custodians of environmental services on behalf of the broader public and the communities themselves on the other, whose priority is frequently the provisioning services that underpin local livelihoods (Vetter 2013). The situation is further complicated by the fact that communities in rural areas are increasingly heterogeneous, resulting in different groups of local actors affording different priorities to the type and extent of services they need rangelands to provide (Shackleton and Luckert 2015). Thus, potentially antagonistic priorities for ecosystem services in communal rangelands in South Africa exist at a variety of levels from national down to local (Figure 1). If these services are to be delivered in a manner that is both sustainable and socially appropriate, then a way needs to be found to reconcile the different social and environmental outcomes required for particular land use scenarios. One way to approach this is to consider the relationship between different antagonistic ecosystem service outcomes as a series of trade-offs (Klapwijk et al. 2014). Trade-offs are interactions between ecosystem services that involve diminishing or losing one service in return for gains in another (Bennett et al., 2009). Establishing the types of trade-offs that will be required under different land use scenarios will be an important first step in helping to reconcile the range of ecosystem outcomes prioritised by different stakeholders.

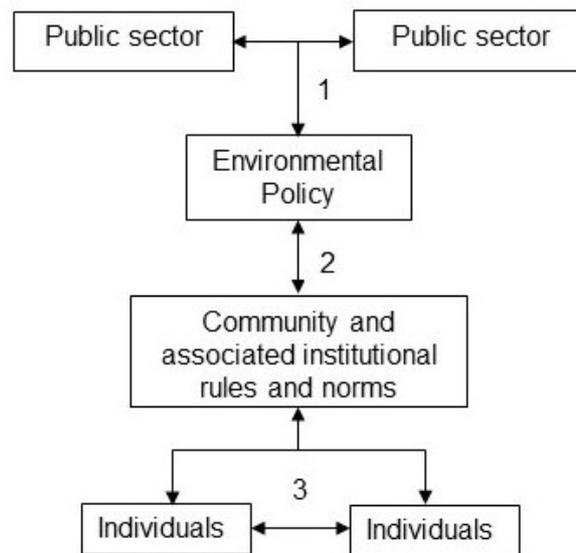


Figure 1: Conceptual framing of key areas of interaction between different stakeholders in determining ecosystem service trade-offs for communal rangelands, identified as: 1) Between different public sector actors in determining environmental policy 2) Translating policy into practice in communal rangelands 3) Within and between community institutions (e.g. traditional leaders) and individuals (e.g. men, women, youth) within communities.

Methods

In demonstrating the application of an ecosystem trade-offs approach in communal rangelands we draw on research being undertaken in the uMzimvubu catchment in Eastern Cape Province as part of an internationally funded project (www.coventry.ac.uk/cawr-tocasa). The area is well-suited to this research, as it is home to many rural communities who make use of local natural resources, provides a major watershed supplying water to downstream users and, importantly, is also subject to extensive colonisation by invasive alien plant (IAP) species such as black wattle (*Acacia mearnsii*), which limits both livestock production and water availability. Our research focused on the Mvenyane community within the catchment, which consists of 12 villages and where work is already ongoing through one of the local project partners. We used the simple conceptual framework in Figure 1 in conjunction with expert advice from local partners in the Umzimvubu Catchment Partnership Programme (UCPP) (<https://umzimvubu.org>), to guide the selection of actors to be engaged in the process of establishing trade-offs between different local ecosystem outcomes. We then engaged these actors in a two-stage research process.

The first stage was the generation of empirical findings from local communities in Mvenyane. This served primarily to establish the key uses made of rangeland by local communities and the relative importance of these to different groups such as men and women. To achieve this, focus groups were held separately with men and women at three villages within Mvenyane in June 2019. Each focus group involved between 12 and 25 participants with discussions facilitated by a member of the research team using a semi-structured interview schedule. To complement this, transect walks and key informant interviews were undertaken at each village, which enabled a deeper understanding of the boundaries and local uses of rangeland. The second stage involved a workshop in the local town of Matatiele, which brought together a range of stakeholders to identify the types of ecosystem trade-offs that would be important to consider in relation to current and alternative land use scenarios. The workshop was convened over two days in October 2019 and involved 35 participants including national and local actors from three government departments, three academic institutions, three national and local NGOs and female and male community members, including traditional leaders from the three local communities. A full list of participants is available in the workshop report (<https://www.coventry.ac.uk/globalassets/media/global/08-new-research-section/cawr/cawr-projects/final-report-trade-offs-rangeland-workshop.pdf>). The format of the participatory workshop focused on establishing and ranking ecosystem service priorities by different stakeholders on the first day to establish where trade-offs are likely to occur, and then relating these trade-offs to alternative land use scenarios on the second day.

Results

During the ranking exercise on the first day of the workshop, local communities identified a range of key services and assets that rangelands provide including water, forest products, grazing, wild foods, sand and clean air. Specifically, when asked to rank the most important services, community members highlighted water and grazing. However, when the findings from the focus groups undertaken with men and women were also considered, a more nuanced set of priorities emerged. Whilst both men and women recognised the importance of rangelands in providing water, men prioritised rangeland for its importance in livestock grazing. Women, in contrast, conceptualised its importance more in terms of provision of timber products, thatching grass and medicinal herbs. Importantly, women also noted that their access to land is limited, and that they are not involved in decision-making around livestock. This clearly highlights the requirement for provisioning service trade-offs within communities, particularly around livestock grazing and its relationship with collection of other rangeland products such as thatching grass and herbs. Community members pointed out that the antagonistic relationship between these different services at present, was mainly due to a lack of institutional capacity to manage rangeland effectively in time and space, and that the introduction of fencing might help with this. What was also apparent during community discussions both in the workshop and in the focus groups, was the key but at the same time conflictual role of IAPs such as wattle within local communities. Whilst wattle was recognised as problematic in diminishing grazing land and local water sources such as springs, it was widely used by all community members for firewood and as timber for fencing and house construction. Some people also supplemented their incomes by selling it locally. Thus, wattle was identified as being central to the potential trade-offs within communities between different types of provisioning services and related social outcomes.

Wattle also featured strongly in the discussions of the public sector actors, NGOs and academics during the workshop. They highlighted water availability within the uMzimvubu catchment, biodiversity and carbon sequestration as some of the key regulating and supporting services provided by local communal rangelands. However, they also recognised the central importance of wattle in the trade-offs between these environmental services. Wattle clearance would likely improve environmental outcomes for key services such as water provision and biodiversity, but potentially diminish other key services such as carbon sequestration. As such, a potential policy disconnect within public sector planning was identified between the current goals of the current Working for Water (WfW) Programme, focused on paying communities to eradicate wattle and the increasing focus of the national government on the role rangelands can play in carbon sequestration. However, what also emerged from the discussions between these groups was that it was unclear how antagonistic the relationship between carbon sequestration and water provision actually is. It was not clear, for example, how much carbon wattle stands could sequester compared to a rangeland with well-managed grassland cover. Likewise, a key question that emerged was whether selective thinning of wattle stands, rather than their wholesale removal, might enable better balance these different ecosystem services as part of a win-win rather than simple trade-off scenario. This formed the basis for a subsequent research trial instigated at the research villages by one of the NGOs involved in the workshop, in early 2020.

Workshop participants also highlighted a disconnect between environmental policy and community practice. NGO representatives pointed out that community members from the Mvenyane villages are being paid through them to engage in wattle eradication as part of WfW's drive to improve catchment water availability, whilst at the same time depending on wattle as their main source of fuelwood and timber. Stakeholders felt that current environmental policy did not do enough to recognise and respond to this contradiction and the potential trade-offs it established between regulating and provisioning services. One of the local chiefs went as far as to say: 'I don't ever remember being consulted about water and environmental policies'.

In light of these contradictions in desired ecosystem service outcomes within and between different actor groups, there was a consensus amongst stakeholders that alternative land use scenarios within communities must focus on balancing these ecosystem outcomes more effectively. They proposed two ways of realising this. The first was retention of wattle in land use systems, albeit at much reduced extent, by management within designated stands possibly in combination with thinning. The second was improved management of areas of rangeland released from wattle encroachment, through a combination of more intensive grazing and resting. This built on initiatives already being trialled by local NGOs within communities involving payments for ecosystem services approaches. Importantly, these approaches have the potential to better accommodate the range of ecosystem services required by these different actors and move from a situation where these are currently antagonistic, to one where there is greater possibility for win-win situations.

Discussion

The research underlined the importance of engaging with a wide range of stakeholders from different sectors, when identifying the key trade-offs that pertain in communal rangelands systems. The framework in Figure 1 was a simple but useful way to determine where trade-offs are likely to occur between different sets of stakeholders and thus which actors needed to be engaged in this process. Invasion of wattle also provided an important cross-cutting issue impacting on the provision of many different ecosystem services and around which all stakeholders could coalesce in thinking through the associated trade-offs in ecosystem services. Shackleton and Gambiza (2008) have also demonstrated the value of applying a trade-offs approach to analyse the contradictory ecosystem service outcomes that IAPs create for local communities. The importance of wattle in Mvenyane also allowed for the envisaging of simple, alternative land use scenarios (with less wattle), which potentially balanced the range of ecosystem service outcomes that stakeholders required more effectively. Key to realising these changes will be not only buy-in from local communities but also their capacity to manage local resources on a collective basis to deliver them. However, the clear weakness of local institutions at Mvenyane will make this difficult and is symptomatic of a more widespread problem in communal areas of South Africa (Bennett et al. 2013). Finding ways to build institutional capacity through better integration of local actors with a remit in natural resource management, will be critical if more equitable and sustainable use is to be made of local resources (Bennett 2013).

The process of stakeholder engagement also reinforced the perception that communities are socially heterogeneous and that this strongly defines the way different actors within communities prioritise local ecosystem services. This must be reflected in the way trade-offs are constructed at the local level (Klapwijk et al. 2014). Ideally, this must extend beyond the gender divisions demonstrated here to include the other often-marginalised social groups within these communities such as youth, the poor and landless. It is also important that this heterogeneity is reflected in environmental policies that impact on communal systems, which are acknowledged to be disconnected from local realities (Vetter 2013), as was also revealed in this research.

Finally, it is apparent that engaging different stakeholders in participatory research is important not only in determining the types of trade-offs that will be required between different ecosystem services but also in identifying key unknowns about aspects of ecosystem function in communal rangeland systems and the research and practice required to address these. NGOs and academics, in particular, can play a pivotal role in this ongoing co-creation of knowledge with local communities, which will be vital in delivering improved social and environmental outcomes from communal rangelands.

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